

10/16/02  
(Ninth draft)

**National Animal Health Emergency Management System Guidelines**

**U.S. Department of Agriculture**

**2003**

DRAFT

**Operational Guidelines**

**Biosecurity**

The National Animal Health Emergency Management System Guidelines provide an operational framework for use in dealing with an animal health emergency in the United States.

The guidelines are produced by the  
Veterinary Services Unit of the Animal and Plant Health Inspection Service,  
U.S. Department of Agriculture.

These guidelines are under ongoing review. Please send questions or comments to:

Emergency Programs  
Veterinary Services  
Animal and Plant Health Inspection Service  
U.S. Department of Agriculture  
4700 River Road, Unit 41  
Riverdale, Maryland 20737-1231  
Telephone: (301) 734-8073 or 1-(800) 601-9327  
Fax: (301) 734-7817  
E-mail: [EMOC@aphis.usda.gov](mailto:EMOC@aphis.usda.gov) or NAHEMS.Guidelines.Comments.aphis.usda.gov

The above address also may be used to request paper copies of the guidelines.

Every effort is made to provide accurate and useful information. However, the U.S. Government, the U.S. Department of Agriculture (USDA), and the Animal and Plant Health Inspection Service (APHIS) and their employees and contractors assume no legal liability for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed herein. Neither the U.S. Government, USDA, or APHIS nor their employees and contractors makes any warranty, expressed or implied, including the warranties of merchantability and fitness for a particular purpose with respect to documents or information available in these guidelines. All indirect, consequential, implied, punitive, and special damages are deemed waived if you use the information in these guidelines in any manner. The sole remedy is the price paid or, at the seller's choice, replacement or repair of the defective information. Trade names are used solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by USDA or an endorsement by the Department over other products not mentioned.

USDA prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

## **PREFACE**

“Biosecurity,” a component of APHIS’ National Animal Health Emergency Management System (NAHEMS) Guidelines series, is designed for use by Veterinary Services (VS) personnel in the event of a major animal health emergency such as an incursion of a foreign animal disease or a natural disaster in the United States. The NAHEMS guidelines provide information that may be integrated into the preparedness plans of other Federal agencies, State and local agencies, and additional groups involved in animal health emergency management activities. Topics covered in the guidelines include:

- Field investigations of animal health emergencies
- Disease control and eradication strategies and policies
- Operational procedures for disease control and eradication
- Site-specific emergency management strategies for various types of facilities
- Administrative and resource management
- Educational resources

The NAHEMS guidelines provide a foundation for coordinated national, regional, State, and local activities in an emergency situation. As such, they are meant to complement non-Federal preparedness activities. The guidelines are being reviewed and updated on an ongoing basis, and comments and suggestions are welcome.

“Biosecurity” provides guidelines for Biosecurity Unit Leaders and associated personnel responsible for biosecurity activities. The guidelines are meant for use as a practical guide rather than as a comprehensive reference resource.

The general principles provided in the guidelines are intended to serve as a basis for making sound decisions. However, deviations from the guidelines may be permissible, if necessary, to address a given situation effectively. In addition, information provided in various sections may need to be combined to meet the requirements of a particular situation.

## **Acknowledgments**

“Biosecurity” reflects the efforts of a number of individuals, including an APHIS Veterinary Services (VS) Writing Group, additional APHIS staff members, and a wide range of reviewers. The reviewers include Federal and State Veterinarians, members of APHIS’ animal health emergency response teams, officials of other Federal agencies, representatives of industry, and additional experts. The contributions of each individual are appreciated.

Also acknowledged with appreciation are the efforts of USDA staff and external reviewers involved with the development of the VS animal health publications (“red books”) and similar documents that have served as information sources for the NAHEMS guidelines.

## Contents

Preface.....	3
Acknowledgments.....	4
Introduction.....	7
Emergency Response Exercises.....	8
Interagency Outreach.....	9
Responsibilities of Biosecurity Personnel .....	10
The Biosecurity Unit Leader.....	10
The Biosecurity Team Manager.....	12
The Biosecurity Team Member .....	14
Hazard Communication .....	14
Personnel Orientation Factsheets.....	15
Assessing Needs.....	15
Biosecurity: General Considerations .....	16
Common Sources of Biosecurity Risk.....	16
Mitigating Biosecurity Risk.....	17
Housed Animals.....	17
Animals Penned Outside.....	17
Clothing.....	18
A Biosecurity Plan .....	19
Cleaning and Disinfection.....	19
Movement Controls .....	20
Isolation.....	21
Dealing with Visitor Risk .....	22
Biosecurity Awareness.....	29
References.....	30
Acronyms.....	31
Glossary .....	32

## Appendix I. Sample Personnel Orientation Factsheet

Biosecurity: DOs and DON'Ts.....	34
----------------------------------	----

## Appendix II. Sample Checklist

Biosecurity: Equipment and Supplies Checklist.....	36
--	----

## Introduction

Blood and Studdert define “biosecurity” as “security from transmission of infectious diseases, parasites, and pests” among livestock, poultry, wildlife, and zoo animals and, if the disease agent is zoonotic, among humans as well. During a foreign animal disease (FAD) outbreak, biosecurity measures are implemented to prevent or mitigate pathogen spread, thus protecting the economic viability of the agricultural industry and the nation and also—if the disease is zoonotic—the health and well-being of the public. Although biosecurity measures should be implemented on an ongoing, day-to-day basis in all agricultural operations, such measures truly are critical during an FAD outbreak.

This document describes the biosecurity measures that are necessary during an animal disease emergency to (a) keep disease agents out of livestock and poultry populations (e.g., herds, flocks, or other groups of animals) in which the agents do not already exist and (b) prevent the spread of disease agents already in the population to uninfected groups within the population. Properly implemented, these measures will reduce the risk of pathogen transmission during the movement of personnel and material between premises necessary for the extensive activities (e.g., surveillance, vaccination, appraisal, depopulation, and disposal) of a disease campaign. Also included is guidance for Biosecurity Unit Leaders and associated personnel on choosing and implementing optimal biosecurity measures for a range of situations.

The guidelines are meant for use as a practical field resource rather than as a comprehensive reference work. Additional information on biosecurity may be obtained from sources such as:

- The APHIS home page ([www.aphis.usda.gov](http://www.aphis.usda.gov)). Examples include the APHIS factsheet “Routine Biosecurity Measures for On-site Farm Visits or Other Livestock Concentration Points” ([www.aphis.usda.gov/oa/fmd/fmdbiose.html](http://www.aphis.usda.gov/oa/fmd/fmdbiose.html)) and materials accessible via APHIS’ Centers for Epidemiology and Animal Health home page ([www.aphis.usda.gov/vs/ceah](http://www.aphis.usda.gov/vs/ceah); perform a search using “biosecurity” as a keyword).
- Institutions of higher education (e.g., Purdue University’s National Biosecurity Resource Center; [www.biosecuritycenter.org](http://www.biosecuritycenter.org)).
- State agricultural extension services. Examples of available information include The Ohio State University Extension Factsheets “Biosecurity for Youth Livestock Exhibitors,” “Biosecurity Fundamentals for Extension Personnel,” “Disinfection in On-Farm Biosecurity Procedures,” and “On-Farm Biosecurity: Traffic Control and Sanitation” (<http://ohioline.osu.edu>; select “Factsheets” and “Veterinary Preventive Medicine Series”).
- Industry. Resources such as the “Biosecurity Guide for Pork Producers” and “Security Guide for Pork Producers” ([www.biosecuritycenter.org/biosecurity.pdf](http://www.biosecuritycenter.org/biosecurity.pdf)), for example, are issued by the National Pork Board in conjunction with the National Biosecurity Resource Center of Purdue University and the American Association of Swine Veterinarians.

- The Web sites of the agricultural ministries or departments of other countries. Examples are seen in the Web sites of the United Kingdom’s Department for Environment, Food & Rural Affairs ([www.defra.gov.uk](http://www.defra.gov.uk); select “Animal Health and Welfare” and then “Biosecurity and farm visits”) and of the Canadian Food Inspection Agency ([www.inspection.gc.ca](http://www.inspection.gc.ca); select “English” and conduct a search using “biosecurity” as the key word to access a number of resources, including “Farm Biosecurity...A Common Sense Guide”).

The NAHEMS guidelines focus on essential areas such as the responsibilities of biosecurity personnel, methods of minimizing the risk of pathogen transmission, and development of a biosecurity plan. The document is designed for use not only in emergency situations but also in animal health emergency training programs. A brief overview of key elements of such programs is provided below.

### **Emergency Response Exercises**

Well before an animal health emergency strikes, biosecurity personnel should use the “Biosecurity” guidelines in emergency response exercises designed to help them expand their knowledge of animal health emergency management. Such sessions will help learners identify likely emergency scenarios and develop detailed plans for responding to each scenario effectively.

**The First 24 Hours**—A useful assignment challenges participants to use the guidelines to create a detailed plan for the first 24 hours of an animal health emergency. Participants can use information in the guidelines to answer questions such as:

- What relationships with other key personnel, including individuals in the emergency management community, should be in place prior to the emergency?
- What key information and resources (e.g., equipment and supplies) need to be readily available, and where and how will they be obtained, stored, and accessed?
- What actions will need to be taken immediately? If these actions are not taken, what will the consequences be?
- What obstacles may appear, and how will they be overcome?
- What conflicting pressures are likely, and how will they be balanced?
- If an initial plan fails, what are the elements of an effective alternative plan?

**Evaluation**—The evaluation phase of emergency response exercises will provide participants with the opportunity to use the guidelines to (a) evaluate the strengths and weaknesses of their responses in the simulation exercises and (b) focus on ways to improve their response capabilities in the event of an actual animal health emergency. The exercises also will underscore



the need for participants to develop and maintain strong collaborative relationships with their counterparts in the emergency management community.

## **Interagency Outreach**

If the presence of an FAD, arthropod vector, or other type of animal health emergency is identified in the United States, the appropriate local, State, and Federal Governments and their partners in the private sector (e.g., industry and academia) must respond in a coordinated, mutually supportive manner to (a) determine the nature of the outbreak, (b) initiate an appropriate response, (c) eliminate or control the disease, and (d) help facilitate recovery (e.g., resumption of trade). The NAHEMS guidelines are designed for use at any of three levels of response commensurate with the severity of the outbreak.

These levels include:

- *A local/limited response.* This level of response is managed by local, State, Federal, and industry officials, with response coordination provided primarily at the State and regional levels and with national-level consultation and consequence management (e.g., trade issues).
- *A regional response.* A regional response is managed by local, State, Federal, and industry officials—in some cases, with the involvement of the appropriate State emergency management agency as specified in State animal health emergency response plans. National-level crisis management, response coordination, consultation, and consequence management are required.
- *A national response.* This level of response requires the combined efforts of local, State, industry, and Federal agricultural officials as well as nonagricultural personnel from Government (e.g., the Federal Emergency Management Agency) and the private sector in national-level crisis management, response coordination, consultation, and consequence management.

Regardless of response level, the agricultural community must be prepared to work closely with the emergency management community to deal with an animal health emergency. The State-based, nationally coordinated Animal Emergency Response Organization (AERO) model addresses this need. The AERO model is based on the Incident Command System (ICS), an emergency response approach used widely in the emergency management community.

To promote the widest possible application and implementation of guidelines content, this publication refers to the titles of officials and groups based on the AERO/ICS model. It is hoped that this approach will help the reader understand the essential aspects of animal emergency response activities in terms of the model.

## **Responsibilities of Biosecurity Personnel**

Biosecurity personnel provide services that are essential to an effective animal health emergency response, including the need to control and eradicate a foreign animal disease. Key biosecurity personnel include (a) a Biosecurity Unit Leader, who is based at the Incident Command Post, and (b) multiple Biosecurity Team Members (forming teams, each of which is headed by a Biosecurity Team Manager, and working—usually on an individual basis—on multiple premises. A Biosecurity Team Member typically will remain on a given premises for a significant period of time to lead and monitor ongoing biosecurity efforts—in contrast to teams from other units (e.g., appraisal, euthanasia, or disposal), who normally will visit the premises for shorter periods.

As an integral part of the overall animal health Incident Command System, the Biosecurity Unit works closely with other units to ensure a smoothly functioning operation. The Biosecurity Unit is located in the Operations Section.

All biosecurity personnel should learn as much as possible about the procedures discussed in these guidelines and in other information sources such as those mentioned in the previous section. They also should participate in educational sessions and emergency response exercises designed to help them expand their knowledge and expertise in the area of animal health emergency management.

### **The Biosecurity Unit Leader**

The responsibilities of the Biosecurity Unit Leader—whether at the national, regional, State, or local level—focus primarily on ensuring that biosecurity measures are implemented effectively during an animal disease outbreak or other animal emergency (e.g., a natural disaster). The goal of such measures is to prevent the movement of a disease agent (a) from an infected premises to an uninfected premises and/or (b) from infected animals to uninfected animals on the same premises.

The Biosecurity Unit Leader must ensure that all biosecurity personnel are familiar with direct, indirect, and arthropod-borne mechanisms of pathogen transmission. They must understand that pathogen transmission to susceptible species may occur:

- Directly, via animal contact with an infected animal or its products, including blood; secretions (e.g., milk and saliva); excretions (e.g., manure and urine); epidermal outgrowths (feathers, hair, wool, horns, and hooves); and breath, or via arthropod vectors (e.g., insects and ticks) that may serve either as mechanical carriers of a disease agent or as an important part of the life cycle of the agent (e.g., mosquitoes that carry the Rift Valley fever agent).
- Indirectly, via animal contact with contaminated feed, water, fomites, and people or animals (e.g., roaming and scavenging wildlife—including vermin and dogs—on the premises and surrounding areas) that are contaminated but not infected or susceptible.

Fomites may include clothing, tools, equipment, vehicles, bedding, and other inanimate objects. The wind, which is often blamed for pathogen transmission, is most likely responsible only for moving dust, bedding, feathers, and other light objects that can act as fomites.

Biosecurity personnel also must appreciate the importance of biosecurity measures and understand the ways in which they can be used to control or eliminate each of these means of pathogen transmission. (For further information on individual nonsusceptible species, see the “Wildlife” guidelines, in progress.)

**General Responsibilities**—The Biosecurity Unit Leader should be identified well before a disease outbreak or other animal health emergency occurs. This individual:

- Ensures that up-to-date contact information is maintained on personnel who are willing and qualified to serve as Biosecurity Team Managers and Members. Complete contact information for all biosecurity personnel should include names; postal, express mail, and e-mail addresses; cell, office, and home telephone numbers; and fax numbers.
- Assigns personnel to Biosecurity Units and appoints a Biosecurity Team Manager to supervise each team of Biosecurity Team Members.
- Assigns Biosecurity Team Managers to various areas or groups of premises.
- Serves as a technical resource for information on current biosecurity methods and procedures and maintains files of resource materials on these topics.
- Informs industry groups and others of ways to prevent pathogen transmission. Establishes and maintains effective working relationships with individuals such as renderers, feed-mill operators, transportation company representatives, livestock and poultry producers, processing-plant managers, and others.
- Determines the number and types of personnel, vehicles, and equipment (see Appendix II) needed to conduct biosecurity operations. Communicates with the Operations Section Chief to ensure that the required resources are available.
- Identifies personnel training requirements and is responsible for (a) ensuring that employees are oriented (by the Safety Officer) to on-the-job hazards and ways to avoid these hazards, (b) explaining Biosecurity Team Members’ duties to them and training them in biosecurity policies and procedures, and (c) ensuring that personnel implement proper biosecurity measures in their work.
- Coordinates biosecurity activities with the activities of personnel from other units (e.g., appraisal, euthanasia, and disposal).
- Prepares briefings and reports for the Operations Section Chief on a regular basis and notifies him or her immediately of any problems.

- Verifies the accuracy and completeness of all required reports and submits them promptly for entry into the APHIS Emergency Management Response System or an agreed-upon alternative reporting system.
- Works closely with other units in the animal emergency response organization.

### **The Biosecurity Team Manager**

Typically, the Biosecurity Team Manager is given responsibility for the implementation of biosecurity measures in a clearly delineated area or on a specific number of premises. The Biosecurity Team Manager supervises the activities of the Biosecurity Team Members and assigns them—usually individually—to infected or contact premises. Biosecurity Team Members work to ensure the biological security of premises personnel, facilities, and equipment from the time that biosecurity measures are initiated until the premises quarantine is lifted.

The Biosecurity Team Manager:

- Assists the Biosecurity Unit Leader in explaining Biosecurity Team Members' duties to them and in training them in biosecurity policies and procedures.
- Assigns tasks (e.g., coordination of on-site biosecurity) to Biosecurity Team Members and other biosecurity personnel and supervises their work.
- Assists the Biosecurity Unit Leader in determining the personnel, vehicles, and equipment required to operate biosecurity and disease prevention activities efficiently.
- Works with the premises owner or manager to create a detailed property map showing roads, neighboring premises, gates, property access, and other relevant geographic information.
- Sees that personnel follow biosecurity measures and that such measures are implemented for all people, animals, vehicles, equipment, and other materials entering or leaving an infected or contact premises.
- Ensures that all movements on and off the premises are controlled. This may include (a) assigning a Biosecurity Team Member to establish a premises security system or to serve as a permanent guard (e.g., 8 hours per day or—for high-risk premises—in shifts for 24 hrs per day, 7 days per week) at one entrance and locking all other entrances, (b) preventing the entry of unauthorized people, animals, machinery, and vehicles onto the property (with entry allowed only if a permit has been issued by a Permit Officer or upon authorization from the Biosecurity Unit Leader), (c) arranging for the boundary fences to be patrolled and repaired as necessary, and (d) briefing security staff daily on anticipated activities and issues relevant to biosecurity.

- Ensures that a Biosecurity Team Member works with the owners and managers of the infected premises to increase biosecurity awareness. This individual also should (a) ensure compliance with established premises movement restriction plans until preliminary cleaning and disinfection (C&D) has been completed and animals have been depopulated and (b) ensure that in cases in which residents leave the property, strict attention is paid to biosecurity and C&D measures and to the need to prevent contact with animals on other premises.
- In consultation with the Biosecurity Unit Leader, ensures compliance with the permit system devised to facilitate the safe inter- and intra-State movement of animals and animal products.
- Ensures that all movement of animals and animal products on or off a premises is monitored for compliance with movement permit restrictions.
- Verifies that quarantine notices are placed at all premises entrances. (For additional information, see the NAHEMS “Quarantine and Movement Control” guidelines, in progress.)
- Ensures that a Biosecurity Team Member maintains an accurate log of all personnel and equipment (including vehicles) entering and leaving each infected and contact premises.
- Establishes an identification system with which to monitor individuals who enter the premises in order to prevent the entry of unauthorized individuals.
- Reports possible biosecurity breaches to the Biosecurity Unit Leader.
- Encourages each premises owner to establish or upgrade an ongoing premises biosecurity plan and assists in its implementation.
- Provides complete data and sound advice to the owner and appropriate officials so as to secure support and acceptance of biosecurity procedures.
- Establishes and maintains an effective communications system on the infected premises.
- Stays current on information and knowledge concerning disease prevention principles and practices.
- Prepares briefings and reports for the Biosecurity Unit Leader and notifies him or her immediately of any issues or problems.

### **The Biosecurity Team Member**

The work of the Biosecurity Team Member on an infected or contact premises is essential to the containment and control of a disease outbreak. The Biosecurity Unit Leader should assign a

Biosecurity Team Manager and Biosecurity Team Member to each premises as soon as possible after it is declared an infected or contact premises.

Biosecurity Team Members usually work individually on each infected premises with the owner and his/her family, personnel, and any visitors. Each Team Manager may be responsible for a designated area or a certain number of premises.

Before the Biosecurity Team Member's arrival on a premises, a foreign animal disease diagnostician (FADD) or other designated official will have visited the premises to observe the animals for clinical signs and/or to take samples. Evidence obtained by the FADD and/or other officials, which will be documented in the EMRS or other agreed-upon alternative reporting system, will indicate that the animals and materials are at risk of transmitting an FAD pathogen and that biosecurity measures must be initiated and maintained. Upon arrival on the premises, the Biosecurity Team Member should assist the Biosecurity Team Manager in the Team Manager's tasks as outlined earlier in this section.

The Biosecurity Team Member should encourage the owner to establish and/or upgrade an ongoing premises biosecurity plan (see Section 4, "A Biosecurity Plan"). Important elements of such a plan include C&D; control of the movement of people (including residents, personnel, and visitors), animals, vehicles, and equipment; and isolation of new, returning (e.g., from breeding or exhibition), or ill animals as well as evaluation of risk posed by visitors and dealing with visitor risk during an outbreak.

### **Hazard Communication**

Before any biosecurity work is initiated, Biosecurity Team Members should be briefed fully by Training Unit personnel (see the NAHEMS "Animal Emergency Response Organizations: Roles and Responsibilities" guidelines) as to the nature of the disease with which they are dealing. Biosecurity Team Members, in turn, will brief the owner, the owner's family, and premises employees on hazards, especially if the hazards involve a zoonotic disease. Biosecurity Team Members will coordinate closely with teams from other units (e.g., appraisal, euthanasia, or disposal) that may visit the premises. (These units will have been briefed previously on hazards.)

Specific safety precautions or hygiene requirements should be explained before the team enters the premises. (This is particularly important if a zoonotic disease is involved.) In addition, the team should be supplied with all necessary safety equipment. Respirators, gloves, and eye protection, for example, must be supplied if the personnel are at risk from a disease organism or chemical hazard, if significant amounts of dust are generated, or upon individual request. (For further information, see APHIS' "Safety and Health Manual," including the APHIS Respirator Program Guidelines in Chapter 11, Section 3 of the manual.)

### **Personnel Orientation Factsheets**

Certain sections of this document may be especially relevant to the responsibilities of individual biosecurity personnel. Accordingly, the Biosecurity Unit Leader may wish to distribute one- or

two-page laminated factsheets on various responsibilities or tasks to these individuals. For a sample factsheet, see “Biosecurity: DOs and DON’Ts” (Appendix I).

### **Assessing Needs**

Needs for biosecurity personnel, vehicles, and equipment will be determined at the time of an animal health emergency by the Biosecurity Unit Leader in consultation with Biosecurity Team Managers. The Biosecurity Unit Leader will work with State emergency management agencies to identify Biosecurity personnel with the required expertise from multiple Government and private sources.

The Biosecurity Unit Leader must advise the Operations Section Chief of any personnel requirements that cannot be satisfied locally so that arrangements for additional personnel can be made. The Biosecurity Unit Leader also will work with appropriate officials to issue contracts and leases regarding equipment or personnel for the biosecurity operation.

## Biosecurity: General Considerations

An outbreak of a foreign animal disease, particularly one that is highly contagious, has a potentially serious impact on the agricultural industry and, if the disease is zoonotic, on public health. Accordingly, veterinarians, owners, and other personnel in contact with animal enterprises should implement strict biosecurity measures to prevent or slow the spread of the disease agent. Biosecurity measures also should be implemented routinely as part of an overall livestock health program.

A sound biosecurity plan (see Section 4) should be followed in daily practice. During an outbreak, adherence to a biosecurity plan becomes even more critical. This plan should reflect biosecurity principles and procedures concerning the movement of people, animals, vehicles, and equipment; animal handling, examination, treatment, euthanasia, and necropsy; and disposal of animal carcasses, animal products, feed, water, straw, hay, and other materials potentially carrying the disease agent. (For further information, see the “Cleaning and Disinfection,” “Disposal,” “Euthanasia,” and “Quarantine and Movement Control” guidelines, in progress.)

As mentioned earlier, FADs may be spread to susceptible species (a) directly, via animal contact with an infected animal or its products, secretions, excretions, epidermal outgrowths, and breath, or via arthropod vectors that may serve either as mechanical carriers of a disease agent or as an important part of the life cycle of the agent or (b) indirectly, via contact with feed, water, fomites, and people or other animals that are contaminated with a pathogen but not infected by or susceptible to it. Effective biosecurity measures are essential to the prevention of pathogen spread via these means.

## Common Sources of Biosecurity Risk

Identification of biosecurity risks is a key element in preventing the introduction of disease pathogens onto a premises. Common areas of risk include:

- *People, animals, vehicles, and equipment.* All movements of people, animals, vehicles, and equipment on and off the property must be controlled to reduce the risk of pathogen transmission. This may include measures such as establishing a guard at entrances, locking unguarded entrances, and patrolling and repairing boundary fences. Strict biosecurity measures for people, animals, vehicles, and equipment must be observed at all times.
- *Contaminated feed and/or water.* Feed should be purchased only from suppliers that have a quality assurance program in place for the safe manufacturing, storage, and delivery of their products. Special care should be taken to prevent feed and water from coming into contact with animal waste or other potentially contaminated animal products. If the owner has any reason to suspect that water has been contaminated, it should be tested and its safety established before it is given to animals.



- *Contact with other animals.* Exposure to pathogens can occur at livestock shows, in hospital pens, in situations involving contact with wildlife (e.g., deer, rodents, birds, insects, and ticks) and during introduction or reintroduction of animals into a herd. Owners should do everything possible to protect their herd from contact with other animals.

### **Mitigating Biosecurity Risk**

The potential impact of major risk factors for an FAD or introduction of an FAD arthropod vector can be mitigated with appropriate biosecurity actions that include:

- C&D of premises, vehicles, equipment, and materials as well as C&D or disposal of contaminated materials. Feed equipment should not be used for manure handling.
- Accounting for the recent history of all animals at the premises of origin through accurate recordkeeping.
- Accounting for the recent history of potentially contaminated equipment and animal transport vehicles that could infect the premises, including renderers' trucks that may be used to haul carcasses away from the premises.
- Institution of appropriate hygienic precautions for people having contact with animals, animal products, and animal secretions and excretions.
- Quarantine and isolation of additions to herds and flocks.

### **Housed Animals**

Under most circumstances, housed susceptible animals are at reduced disease risk and should remain housed if possible. This is particularly true if turning them out of a housed environment would result in contact with infected animals or animals of unknown disease status.

Animals should not be moved into barns or other facilities that have housed infected or potentially infected animals unless these buildings first have been cleaned and disinfected thoroughly.

### **Animals Penned Outside**

If susceptible animals are penned outside at all times or if they must be turned out from a housed environment, biosecurity personnel should encourage owners to reduce the risk of pathogen transmission by observing the following guidelines:

- Keep groups of animals separated by a distance sufficient to prevent pathogen transmission (e.g., at least one empty field away from any other stock).

- Do not permit close or direct contact between groups of animals. The owner should consult with neighbors about the use of boundary or adjoining fields as barriers and should check that all fences are secure.
- Do not put animals on pastures that have been grazed by potentially infected animals.

Regardless of the animals' housing location, the owner or manager should:

- Inspect susceptible livestock and poultry regularly for signs of disease, and discuss any concerns with a veterinarian. If the presence of an FAD is suspected, the veterinarian should report this to the State Veterinarian or APHIS/VS Area Veterinarian in Charge.
- Make every effort to avoid moving animals while ensuring that their welfare is not compromised.
- Ensure that every time people visit one or more animals in any setting, they follow biosecurity procedures and understand the risk they themselves pose to the health of the animals by potential transmission of pathogens (e.g., via clothing, footwear, vehicles, and equipment or via nonsusceptible animals, such as herding dogs).
- Minimize visitor contact with susceptible animals and, if possible, arrange for people who do not have contact with other animals to care for the animals.
- Ensure that if travel between premises is necessary, each site is treated as a separate, biosecure unit (e.g., with observance of biosecurity and C&D procedures for personal hygiene, clothing, footwear, vehicles, and equipment—both upon arrival and upon departure).

## Clothing

Careful attention to clothing is an essential element of a successful biosecurity plan. Outerwear may be either disposable or reusable, as discussed below.

**Disposable Outerwear**—It is highly recommended that all visitors—regardless of risk level—be provided with disposable coveralls, boots, hats, and gloves for use during their premises visits. Disposable garments are much more economical than reusable outerwear, which must be kept in an array of sizes and which must be cleaned, disinfected, and maintained.

**Reusable Outerwear**—If reusable clothing is used, it must be machine washable. Waterproof or nylon coveralls may be purchased for use in wet, dirty conditions. Although nylon coveralls are not completely waterproof, they are less permeable than cotton and are less apt to soak through with moisture. They also are light and wind resistant and withstand repeated machine washings well. Nylon coveralls may be damaged in automatic dryers if the heat is too high, but they air dry quickly.

## **A Biosecurity Plan**

A good biosecurity plan is important both for the eradication and control of disease during an animal health emergency and for the routine maintenance of livestock health. Biosecurity measures in either case are aimed at (a) keeping disease agents out of livestock and poultry populations in which the agents do not already exist and (b) preventing the spread of disease agents already in the population to other uninfected susceptible or nonsusceptible groups (the latter can serve as a fomite) within or outside the population.

Ideally, biosecurity measures minimize the risk of pathogen spread via people, animals, vehicles, and equipment from premises to premises during animal disease control and eradication efforts. These measures are especially important to the prevention of unintentional pathogen transmission during the period of time before a disease agent is identified.

A basic biosecurity plan for attaining these goals—both in an emergency situation and in routine practice—consists of at least three essential elements:

- Design and implementation of C&D procedures to reduce or eliminate pathogens and pathogen transmission.
- Control of the movement of people, animals, vehicles, and equipment.
- Isolation of newly purchased animals—obtained from the healthiest possible sources—and of returning animals (e.g., after breeding or exhibition) from existing herds for a suitable period of time.

Each of these elements is described briefly below. Subsequent discussion focuses on the application of various aspects of these elements in dealing with visitor risk—both during normal circumstances and during a disease outbreak.

## **Cleaning and Disinfection**

The term “cleaning and disinfection” refers to a combination of physical and chemical processes that kill or remove pathogenic microorganisms—a combination that is vital for the protection of animal health and the eradication of disease. In the extensive activities essential to a disease eradication campaign, effective personal C&D minimizes pathogen transmission between premises.

During a disease outbreak, the clear identification of the disease agent involved and a thorough understanding of its biological properties and mode of spread are intrinsic to sound strategic planning for C&D. Beyond that, emphasis should be placed on the adoption of the basic microbiological principles of (a) isolation of the source of infection and (b) C&D of personnel, supplies, equipment, vehicles, and sites.

The importance of patient, persistent attention to detail in effective C&D cannot be overemphasized. For example, a key element of C&D is the preliminary cleaning of a surface to remove dirt, debris, and organic material before using disinfectants. Without preliminary cleaning, the effectiveness of the disinfectants in inactivating disease agents will be compromised. (See the NAHEMS “Cleaning and Disinfection” guidelines, in progress, for further information, including the cleaning and disinfecting of premises on which animals infected with an FAD have been held.)

## **Movement Controls**

Control of the movement of people, animals, vehicles, and equipment is critical to the maintenance of biosecurity during a disease outbreak or other animal emergency. Examples of practices involving movement controls include maintaining a closed herd or flock, identifying all animals, keeping accurate records, and protecting animals from contact with wildlife. Each of these practices is discussed below.

**Maintaining a Closed Herd/Flock**—As much as possible, owners should maintain herds and/or flocks that are “closed” to the introduction of new animals (with population increase occurring only from herd/flock offspring), thus decreasing the potential for transmission of disease agents from other animals. All livestock and/or poultry should be vaccinated against common diseases. When new animals must be introduced, they should be isolated upon arrival and vaccinated to match the herd vaccination pattern.

Routine disease prevention principles such as “all-in/all-out” housing also should be followed. Ideally, the premises on which animals are housed should be fenced and should have a locked, gated driveway.

**Identifying Animals**—Individual animal or group identification is essential to the effective implementation of biosecurity measures. Identification:

- Enables the owner to keep track of each animal or group of animals so that each animal’s location and movement within the premises and its movements on or off the premises can be documented accurately.
- Can be used to identify herd or flock mates that have had direct contact with—and therefore exposure or potential exposure to—an animal known to be infected.
- Permits tracking of individual animals or animal groups and facilitates the keeping of records on health, vaccination, pedigree, and production.

A permanent method of animal identification such as a metal ear tag, a Farm Animal Identification and Records (“FAIR”) tag, or electronic identification should be used. Any identification method used should have an adequate number of alphanumeric characters to ensure that duplication will not occur during the normal lifespan of an animal.

In cases in which individual animal identification is economically unfeasible (e.g., for large numbers of animals), other methods of assuring animal movement controls can be considered. For example, the owner can—if practicable—take inventories of the animals on at least a weekly basis to discern whether animals have been added to (or are missing from) their designated groups.

**Keeping Records**—Accurate records are essential during a disease outbreak to facilitate accurate tracing of individual animals for epidemiological purposes. Such information can be useful during an outbreak in tracing animals' possible exposure to disease (e.g., from embryo and semen sources). Records also can help the owner keep track of feed, other supplies, and equipment that have entered or left the premises.

Every animal brought onto a premises—whether it is a new purchase or being returned to the premises—should be accompanied by a record containing individual animal identification, routes of animal transport vehicles, documentation of the species of animal(s) hauled, the origin and destination of the trip, and the driver's name and contact information. This information can help the owner determine the animal's potential for disease exposure.

**Protecting Animals From Wildlife**—Rodents and most other forms of vermin and wildlife are very mobile and can spread disease agents (e.g., rabies and leptospirosis) on a premises. Owners should take action to protect their animals from contact with vermin and other wildlife by cleaning up old buildings, debris, and spilled grain and by implementing a pest control program. (See the NAEHMS "Wildlife Management" guidelines, in progress.)

## **Isolation**

Bringing new animals onto a farm poses a risk of introducing an infectious disease agent from the new animals to the resident farm animals. Animals should be purchased from herds known to have high health status, and bedding and feed should be obtained from sources known to be reputable. Owners should ensure that all acquisitions of semen and embryos are from animals known to be healthy and from healthy herds. Care should be taken to ensure that all new additions to a herd are vaccinated to match the herd vaccination pattern.

Newly purchased animals or animals being returned to the herd should be isolated completely for at least 30 days. This can be accomplished by confining the new animals to pens that do not permit any form of contact with other animals or with their excretions or secretions.

In planning isolation areas, particular care should be taken to provide for effluent containment to avoid the contamination of other animals and their feed and water supplies. No sharing of feed or water supplies or equipment should occur between the isolated animals and the resident animals.

If vaccination is to be used, newly purchased animals should be vaccinated within the first week of the 30-day isolation period to bring them up to the vaccination level of the herd. This will allow at least 21 days for the new animal to develop adequate protective antibodies before joining the main herd.

The caretaker of new or returning animals that are in isolation should, at a minimum, have separate coveralls and boots available for use while caring for the animals. This individual should care for the isolated animals after taking care of the other animals and should not return to the main herd until he or she has taken a shower and donned clean clothing and boots.

During the isolation period, the animals can be tested for diseases of concern. The animals should not be allowed contact with the herd until negative test results are received.

## **Dealing With Visitor Risk**

Visitors can visit a premises for a wide variety of reasons, from social calls to reading the electricity meter, delivering feed, or vaccinating an animal. Each visit provides an opportunity—however inadvertent—for the transmission of pathogens to premises animals and thus is of concern. The remainder of this section focuses on risks posed by visitors—both under normal circumstances and during a disease outbreak—and concludes with a brief discussion of the importance of maintaining biosecurity awareness.

**Risks Posed by Visitors Under Normal Circumstances**—Under normal circumstances (i.e., nonoutbreak conditions), visitors often are classified in terms of low, medium, or high risk, according to the likelihood of pathogen transmission occasioned by the visit. During a disease outbreak, however, the risk levels assigned to a given visit will change (see “Dealing With Visitor Risk During an Outbreak” later in this section). For example, a meter reader visit characterized as “low risk” during normal circumstances could well be considered “high risk” during an outbreak, particularly if the visit occurs within a quarantined area.

Examples of the biosecurity measures appropriate *under normal circumstances* for the three risk levels are provided below. These levels of biosecurity measures are then considered in the context of biosecurity decisions to be made by individuals during an outbreak (a) outside the quarantined area and (b) within the quarantined area.

**Low-Risk Visitors**—Under normal circumstances, low-risk visitors are individuals who have come directly from urban areas and/or have had no other contact with livestock or poultry or with animal premises. These visitors pose very little risk of spreading a disease agent to a herd. Nevertheless, they should be required to avoid contact with animals and with areas in which animals are housed. The visitors will need to be informed of and asked to follow the biosecurity measures in effect on the premises. In addition, the following measures should be implemented:

- To minimize contact with soil, mud, or manure, visitors should park their vehicles on graveled, paved, or concrete areas a minimum of 500 ft from the animal production area. The windows should be closed.
- Visitors’ vehicles ideally should not be allowed on the premises. If a vehicle is allowed, its windows should be closed and its tires, wheel wells, and undercarriage should be cleaned with water (preferably soapy) immediately prior to arrival and immediately after departure.

- All entering visitors should wear clean disposable or reusable protective clothing (e.g., coveralls, hats, and gloves) and clean disposable or reusable boots. If footwear is soiled, it will need to be cleaned and disinfected (see the NAHEMS “Cleaning and Disinfection” guidelines, in progress) before entry onto the premises.
- Visitors should wash their hands with soap and water before entering and after leaving the premises to avoid transmitting disease agents from person to person or to animals.

**Moderate-Risk Visitors**—Moderate-risk visitors include individuals such as salespeople, farm equipment mechanics, property appraisers, and workers responsible for functions such as electrical power, plumbing, fuel, construction, and feed delivery. Minimal animal contact (e.g., walking through animal housing or pastures where the animals are not within reach) typically is unavoidable in the course of such visitors’ duties.

*All of the routine premises-production measures discussed previously should be implemented for moderate-risk workers. In addition:*

- Equipment should be cleaned and disinfected after each use.
- Disposable coveralls and boots should be put into a clean plastic garbage bag after use and left with the owner for disposal.
- Reusable coveralls and boots should be put into a clean plastic garbage bag or other container and cleaned and disinfected after each use.

**High-Risk Visitors**—Visitors in the high-risk category include individuals such as veterinarians, artificial insemination personnel, maintenance personnel having contact with animals, processing crews, animal haulers, and neighbors who have close contact with animals (e.g., handling or inspecting the animals or walking through narrowly confined pens or lots where animals are within reach). Also in the high-risk category are animal caretakers and other personnel exposed to animals and their secretions and excretions. Such personnel include animal health technicians, animal inspectors, and people who feed, water, medicate, and/or milk the animals, clean the animals and their facilities, or assist with births.

In addition to the procedures outlined for low- and moderate-risk visitors, high-risk visitors should observe the following precautions:

- Identify and maintain a “clean” area in the vehicle (usually the passenger area or compartment). The “clean” area must be kept separate from a “dirty” area in the vehicle, usually the cargo area of a truck, the trunk of a car, or the back of a station wagon. After entering the premises, a visitor should be considered “dirty” and thus should not go into the “clean” area of the vehicle (e.g., to replace equipment or supplies) unless he or she has disposed of or cleaned and disinfected exposed clothes, footwear, hats, gloves, equipment, supplies, and any other potential sources of pathogen transmission.

- Plan the necessary clothing, equipment, and supplies for visits (see Appendix II), leaving unnecessary items behind. Necessary small items can be stowed in your pocket. Arrange to have a supply of water to be used for cleaning available near the vehicle parking area.
- Before leaving for the premises, place the clean clothing, equipment, and supplies in the designated “clean” area of the vehicle.
- Check the drainage of the premises to ensure that disinfectant and water used for C&D do not flow off the premises or into water sources such as lakes, creeks, or rivers.
- Ensure that vehicle interiors are clean (ideally, equipped with easily removable rubber floor mats). Vehicle exteriors and trailers—including tires, wheel wells, and undercarriages—should be clean prior to their arrival on the premises.
- Immediately upon exiting the vehicle at each premises, put on clean disposable or reusable outerwear (e.g., coveralls, coats, and jackets) and clean disposable or rubber boots.
- Ensure that clean, disposable plastic sleeves and/or gloves are worn whenever direct contact with animals’ bodily fluids, tissues, or excrement will occur (e.g., births, inseminations, postmortems, or butchering). Ensure that instruments and equipment such as dehorners, castrators, and syringes are sterile before use. Disposable needles and syringes should be used whenever possible.

High-risk visitors should observe the following “exit” procedures before leaving the premises:

- Using soapy water, remove dirt, debris, and organic material from the vehicle’s (and trailer’s) tires, wheel wells, and undercarriage, and/or take the vehicle through a pressure car wash.
- Use a brush and approved disinfectant to clean and disinfect all reusable clothing and equipment thoroughly—including personal items such as eyewear and jewelry if they are not harmed by disinfectant; otherwise they should be washed thoroughly with soap and water or dipped in vinegar (acetic acid). (See the NAHEMS “Cleaning and Disinfection” guidelines, in progress.)
- Follow guidance provided by the Vector Control Unit Leader on any necessary pest control measures related to vehicle biosecurity. (For further information on the role of the Vector Control Officer, see the NAHEMS “Animal Emergency Response Organizations: Roles and Responsibilities” guidelines, in progress.)
- Take off all disposable “dirty” items (e.g., disposable coveralls, boots, and supplies) and place them in a plastic garbage bag to be left on the premises with the owner or producer for disposal. If this is impossible, place the plastic bag in the “dirty” area of the vehicle and dispose of it in a manner that prevents animals’ exposure to it.



- After removing coveralls (either disposable or reusable), scrub the bottoms of soiled rubber boots with a brush to remove all dirt or debris. Then clean and disinfect the boots with an approved disinfectant.
- Dispose of the disinfectant solution according to the label instructions.
- Before entering the “clean” area of the vehicle, remove soiled coveralls so that they are “inside out,” place them in a plastic garbage bag, and put them in a “dirty” area of the vehicle along with other soiled reusable clothing.

At the end of the last visit of the day, visitors should:

- Dispose of all plastic garbage bags containing soiled supplies in a manner that prevents exposure to other people or animals.
- Clean and/or launder all reusable clothing and equipment.
- Take a shower. Personal hygiene should include shampooing one’s hair, cleaning under one’s fingernails, and “clearing” respiratory passages by blowing one’s nose and clearing one’s throat, followed by expectorating into a sink with running water. Hands should be washed with soap and water.

Visits from individuals who recently have traveled in countries with serious animal diseases warrant special precautions. Such visitors should only be allowed contact with susceptible species if absolutely necessary and in any case not until at least 5 days after entering the United States.

Additional biosecurity and cleaning/disinfection procedures, including use of personal protective equipment, are required to address the risks posed by serious zoonotic diseases.

Visitors should be subject to restrictions and to biosecurity and C&D procedures that are appropriate to the level of risk posed by their visit. If an owner or manager is undecided as to the level of risk involved, he or she should “err on the side of caution” and choose the higher level.

**Dealing With Visitor Risk During an Outbreak**—As mentioned, the low-, medium-, and high-risk model can be used to make decisions about visitor biosecurity under normal circumstances. *In an outbreak situation, however, all visitors should be considered high risk—especially within a quarantined area.* As a general rule, the closer a premises is to an infected premises, the greater is the uninfected premises’ vulnerability to pathogen transmission and thus the greater is the necessity for implementation of rigorous biosecurity and C&D measures.

When an outbreak constituting an animal health emergency occurs, officials typically establish quarantined areas around index cases or “hot spots” within a geographic area. Individuals responsible for the livestock on a given premises then must determine whether or not the premises are located (a) outside the emergency quarantined area or (b) within a quarantined area

and therefore subject to movement controls. Once the quarantine status of the premises is known, premises personnel can plan accordingly.

***Visitor Biosecurity Outside a Quarantined Area***—If an outbreak constituting an animal health emergency has occurred in the United States, and a premises is located *outside* the quarantined area, the individuals responsible for the premises should ensure that visitors observe biosecurity and C&D measures commensurate with the level of perceived threat.

Individuals responsible for a premises located immediately adjacent to the border of a quarantined area probably will implement stricter measures than people on a premises located hundreds or thousands of miles away. However, considering the multiple locations to which livestock typically are moved on their way to market, a premises might be vulnerable to pathogen transmission even if it is located a considerable distance from a quarantined area (e.g., a premises could become infected from a passing truck that has breached quarantine).

As a general rule, many individuals responsible for premises outside a quarantined area during an outbreak may choose to ensure that visitors use either the “medium” or “high-risk” categories (or a combination thereof) of visitor biosecurity during an outbreak. In addition, many veterinary practitioners are comfortable with making multiple farm visits outside the quarantined area (despite the fact that such visits are strictly prohibited within a quarantined area) as long as they faithfully observe the measures specified for high-risk visitors.

***Visitor Biosecurity Within a Quarantined Area***—If an outbreak constituting an animal health emergency has occurred *within* a geographic area, and a given premises is located within this quarantined area, all visitors should be considered “high risk,” and therefore premises visits must be kept to a minimum. Veterinary practitioners should limit their premises visits to one premises per day.

(*Note:* Although the procedures below are largely repetitive of material already presented in these guidelines, they are repeated here for reader convenience and because the observance of proper biosecurity measures within a quarantined area is so important.)

The Biosecurity Unit Leader, Team Manager, and Team Members will work with any visitors allowed on the premises to ensure that highly rigorous biosecurity and C&D measures are observed. These procedures include the following:

- A “clean” area in the vehicle (usually the passenger area or compartment) should be identified and maintained. The “clean” area must be kept separate from a “dirty” area in the vehicle, usually the cargo area of a truck, the trunk of a car, or the back of a station wagon. Once entering the premises, a visitor should be considered “dirty” and thus should not go into the “clean” area of the vehicle (e.g., to replace equipment or supplies) unless he or she has disposed of or cleaned and disinfected exposed clothes, footwear, hats, gloves, equipment, supplies, and any other potential sources of pathogen transmission.

- After the visitor leaves the vehicle, biosecurity personnel should consult with him or her promptly to designate an arbitrary line demarcating a “clean” side (on the vehicular side of the line) and a “dirty” side (on the premises side of the line). Once the visitor has crossed the line and gone into the “dirty” side, he or she should not return to the “clean” side unless exposed clothing, footwear, hats, gloves, equipment, supplies, and any other potential sources of pathogen transmission have been disposed of or cleaned and disinfected.
- Visiting personnel should plan the necessary clothing, equipment, and supplies (see Appendix II) for visits and arrange to have a supply of water to be used for cleaning available near the vehicle parking area.
- Before leaving for the premises, personnel should place the clean clothing, equipment, and supplies in the designated “clean” area of the vehicle.
- Only vehicles that are clean and free of dirt, debris, and organic material should be allowed on the premises.
- Personnel should ensure that vehicle interiors are clean and equipped with easily removable rubber floor mats. Vehicle exteriors and trailers—including tires, wheel wells, and undercarriage—should be clean prior to their arrival on the premises.
- To minimize contact with soil, mud, or manure, visitors should park their vehicles on graveled, paved, or concrete areas a minimum of 500 ft from the animal production area. The windows should be closed.
- Check the drainage of the premises to ensure that used disinfectant and water used for C&D do not flow off the premises or into water sources such as lakes, creeks, or rivers.
- C&D of all vehicles’ and trailers’ interiors and exteriors (including tires, wheel wells, and undercarriages) immediately prior to arrival and immediately after departure should be considered. At minimum, the vehicles’ and trailers’ exteriors (including tires, wheel wells, and undercarriages) should be cleaned with soapy water immediately prior to arrival and immediately after departure and/or the vehicle/trailer should be taken through a pressure car wash.
- All entering visitors must wear clean disposable or reusable protective clothing (e.g., coveralls, hats, gloves, and boots) and clean disposable or reusable footwear. If footwear is soiled, it will need to be cleaned and disinfected (see the NAHEMS “Cleaning and Disinfection” guidelines, in progress) before entry onto the premises.
- Visitors should wash their hands with soap and water before entering and after leaving the premises to avoid transmitting disease agents from person to person or to animals.

- Immediately upon exiting the vehicle at each premises, put on clean disposable or reusable outerwear (e.g., coveralls, coats, and jackets) and clean disposable or rubber boots.
- Equipment should be cleaned and disinfected after each use.
- Ensure that clean, disposable plastic sleeves and/or gloves are worn whenever direct contact with animals' bodily fluids, tissues, or excrement will occur (e.g., births, inseminations, postmortems, or butchering). Ensure that instruments and equipment such as dehorner, castrators, and syringes are sterile before use. Disposable needles and syringes should be used whenever possible and left at the site.

Visitors should observe the following “exit” procedures before leaving the premises:

- Using soapy water, remove dirt, debris, and organic material from the vehicle's (and trailer's) tires, wheel wells, and undercarriage, and/or take the vehicle through a pressure car wash.
- Use a brush and approved disinfectant solution to clean and disinfect all equipment thoroughly—including personal items such as eyewear and jewelry. If these items are harmed by disinfectant, they may be washed thoroughly with soap and water or—if an acid-susceptible virus such as foot-and-mouth disease is involved—dipped in vinegar (acetic acid). (See the NAHEMS “Cleaning and Disinfection” guidelines, in progress.)
- Follow guidance provided by the Vector Control Unit Leader on any necessary pest control measures related to vehicle biosecurity. (For further information on the role of the Vector Control Officer, see the NAHEMS “Animal Emergency Response Organizations: Roles and Responsibilities” guidelines, in progress.)
- Place all disposable “dirty” items (e.g., disposable coveralls, boots, and supplies) in a plastic garbage bag to be left on the premises with the owner for disposal. If this is impossible, place the plastic bag in the “dirty” area of the vehicle and dispose of it in a manner that prevents animals' exposure to it.
- Put reusable coveralls and boots into a clean plastic garbage bag or other container and clean and disinfect them after each use.
- Scrub the bottoms of soiled rubber boots with a brush to remove all dirt or debris. Then clean and disinfect the boots with an approved disinfectant.
- Dispose of the disinfectant solution according to the label instructions.
- Before entering the “clean” area of the vehicle, remove soiled coveralls so that they are “inside out,” place them in a plastic garbage bag, and put them in a “dirty” area of the vehicle along with other soiled reusable clothing.

At the end of the last visit of the day, visitors should:

- Dispose of all plastic garbage bags containing soiled supplies in a manner that prevents exposure to other people or animals.
- Clean and/or launder all reusable clothing and equipment.
- Take a shower. Personal hygiene should include shampooing one's hair, cleaning under one's fingernails, and "clearing" respiratory passages by blowing one's nose and clearing one's throat, followed by expectorating into a sink with running water. Hands should be washed with soap and water.

Visits from individuals who recently have traveled in countries with serious animal diseases warrant special precautions. Such visitors should only be allowed contact with susceptible species if absolutely necessary and in any case not until at least 5 days after entering the United States.

Additional biosecurity and cleaning/disinfection procedures, including use of personal protective equipment, are required to address the risks posed by serious zoonotic diseases.

### **Biosecurity Awareness**

Fatigue, stress, distraction, and lack of forethought all can cause even the most conscientious individual to lose focus on the crucial importance of biosecurity measures. Thus, it is essential that all personnel exercise the utmost thought, patience, persistence, and care in creating and carrying out a biosecurity plan—both under normal circumstances and during an outbreak. A little advance thought, planning and extra effort in following biosecurity procedures can go a long way toward preventing pathogen transmission, protecting the well-being of livestock and poultry, and safeguarding American agriculture.

## References

Animal and Plant Health Inspection Service, U.S. Department of Agriculture. "Routine Biosecurity Measures for On-site Farm Visits or Other Livestock Concentration Points" ([www.aphis.usda.gov](http://www.aphis.usda.gov)).

Animal and Plant Health Inspection Service, U.S. Department of Agriculture. "Safety and Health Manual." Washington, DC: Government Printing Office, 1998.

Blood, D.C., and V. P. Studdert. "Saunders Comprehensive Veterinary Dictionary." London: W.B. Saunders, 1999.

Bovine Alliance on Management and Nutrition. "An Introduction to Infectious Disease Control on Farms" (Biosecurity). 2001. (The Alliance is composed of representatives of the American Association of Bovine Practitioners, the American Dairy Science Association, the American Feed Industry Association, and USDA.)

Martin, Meek, and Willeberg. "Veterinary Epidemiology." Ames, Iowa: Iowa State University, 1987.

Shulaw, William P. and Gary L. Bowman. "On-Farm Biosecurity: Traffic Control and Sanitation." Extension Factsheet VME-0006-01. The Ohio State University Extension.

## Acronyms

**AERO**—Animal Emergency Response Organization.

**APHIS**—Animal and Plant Health Inspection Service ([www.aphis.usda.gov](http://www.aphis.usda.gov)). An agency of the U.S. Department of Agriculture.

**C&D**—Cleaning and disinfection

**FAD**—Foreign animal disease

**FADD**—Foreign animal disease diagnostician

**NAHEMS**—National Animal Health Emergency Management System

**TDD**—Telecommunications device for the deaf

**USDA**—United States Department of Agriculture ([www.usda.gov](http://www.usda.gov))

**VS**—Veterinary Services. A unit of the Animal and Plant Health Inspection Service.

## Glossary

**Animal Emergency Response Organization (AERO).** A locally/State-based, nationally coordinated model for responding to animal health emergencies. Utilizes the Incident Command System.

**All-in-all-out housing**—A routine infection-prevention practice in which all animals are removed from an animal housing facility and the building is cleaned and disinfected before new animals are placed in it.

**Arthropod vector**—A member of the phylum Arthropoda that can transmit a pathogen from one host animal to another.

**Biosecurity**—Security from transmission of infectious diseases, parasites, and pests among livestock, poultry, wildlife, and zoo animals or, if the disease agent is zoonotic, among humans as well.

**Biosecurity plan**—A plan or protocol that reflects biosecurity principles and procedures concerning the movement of personnel, vehicles, and equipment; examination of animals (alive or at necropsy); euthanasia; and disposal of animal carcasses, animal products, feed, water, straw, hay, and other materials potentially carrying a disease agent.

**Cleaning and disinfection (C&D)**—Practices involving a combination of physical and chemical processes that kill or remove pathogenic microorganisms—a combination that is vital for the eradication of disease.

**Closed herd/flock**—Herds and/or flocks that are “closed” to the introduction of new animals (with population increase occurring only from herd/flock offspring), thus decreasing the potential for transmission of disease agents from other animals.

**Contact premises**—A premises that an epidemiologist has been determined to be related by sound epidemiological evidence to a known infected premises. Also referred to as an exposed premises.

**Exposed premises**—(See contact premises, above.)

**Fomite**—An inanimate object or material on which disease-producing agents may be conveyed (e.g., feces, bedding, or a harness).



**Movement controls**—Control of the movement of people, animals, vehicles, and equipment so that biosecurity can be maintained during a disease outbreak. Examples of practices involving movement controls include maintaining a closed herd or flock, identifying all animals, keeping accurate records, and protecting animals from contact with wildlife.

**Poultry**—Chickens, ducks, geese, swans, turkeys, pigeons, doves, pheasants, grouse, partridges, quail, guinea fowl, and pea fowl (9 CFR 53).

**Premises**—A tract of land, including its buildings. Also, a building together with its grounds or other appurtenances.

**Zoonotic disease**—An infectious disease that is common to humans and animals.

**Appendix I  
Sample Personnel  
Orientation Factsheet**

**Biosecurity: DOs and DON'Ts\***

Before ENTERING a premises,

**DO:**

- Park your vehicle away from site production facilities and/or ensure that your vehicle's tires, wheel wells, and undercarriage have been cleaned with soapy water so they are free of dirt and debris and/or that your vehicle has been taken through a pressure car wash.
- Designate a "clean" area in your vehicle—usually the passenger compartment. Keep it separate from the "dirty" area—usually the trunk or cargo area.
- Put on clean coveralls, boots, hat, gloves, and other apparel and use only clean equipment and supplies.
- Wash your hands with soap and water.
- Consult with the owner to identify an arbitrary line on the site demarcating a "clean" side and a "dirty" side.

**DON'T:**

- Enter a site's or vehicle's "clean" area unless you have disposed of or cleaned and disinfected all clothes, footwear, hats, gloves, equipment, supplies, and other sources of pathogen transmission.
- Attempt to disinfect a surface unless it first has been thoroughly cleaned (i.e., so it is free of visible organic material).
- Drive your vehicle on a premises any more than necessary. An on-site vehicle should be used for on-site transportation whenever possible.

*\*Note:* Additional biosecurity and cleaning/disinfection procedures are required to address the risks posed by serious zoonotic diseases.

(continued)

## **Biosecurity: DOs and DON'Ts**

(continued)

Before LEAVING a premises,

DO:

- After returning to the vehicle area, use a brush and approved disinfectant to clean and disinfect all reusable clothing and equipment thoroughly—including personal items such as eyewear and jewelry. If these items are harmed by disinfectant, they may be washed thoroughly with soap and water or—if an acid-susceptible virus such as foot-and-mouth disease is involved—dipped in vinegar (acetic acid).
- Clean vehicle exteriors and trailers—including tires, wheel wells, and undercarriages—with soapy water so they are free of dirt and debris and/or take them through a pressure car wash.
- Place disposable coveralls (turned “inside out”), boots, and other soiled items in a plastic garbage bag to be left with the owner or placed in the “dirty” area of your vehicle.
- Dispose of the disinfectant solution according to label instructions.
- Dispose of all plastic garbage bags containing soiled supplies in a manner that prevents exposure to other people or animals.
- Wash your hands with soap and water.
- Clean and/or launder all reusable clothing and equipment.
- At the end of the day, take a shower. Personal hygiene should include shampooing your hair, cleaning under your fingernails, and clearing your respiratory passages by blowing your nose, clearing your throat, expectorating into a sink with running water, and washing your hands with soap and water.

DON'T:

- Bring “dirty” paperwork into the clean area of your vehicle.
- Visit another susceptible site until 12 hrs have passed.\*

*\*Note:* The minimum waiting period of 12 hrs applies only to official animal health emergency personnel who follow biosecurity procedures on their premises visits. For other premises visitors, the minimum waiting period is 5 days.

## Appendix II Sample Checklist

### Biosecurity: Equipment and Supplies Checklist

Supplies should be purchased as needed through local supply sources. Local APHIS/VS officials' or State Veterinarians' offices may assist in locating product vendors. (See the NAHEMS "Cleaning and Disinfection" guidelines, in progress.)

#### Equipment and Supplies

- ☐ Boots—knee-high rubber or disposable plastic overboots
- ☐ Bucket and/or boot tray
- ☐ Coveralls—cloth or disposable plastic (e.g., Tyvek®)
- ☐ Disposable earplugs
- ☐ EPA-approved disinfectant
- ☐ Extra undergarments
- ☐ Face shields (e.g., for use in applying disinfectants with low-pressure sprayer)
- ☐ Fiberglass, metal, or other suitable container for equipment
- ☐ Flashlight with batteries
- ☐ Gloves—industrial and surgical
- ☐ Goggles (e.g., for use in mixing disinfectants from concentrate or applying disinfectants with a high-pressure sprayer)
- ☐ Hand towels (cloth and/or paper)
- ☐ Hoses (with spray attachments)
- ☐ Large, heavy-gauge plastic garbage bags with tape and ties
- ☐ Large water container(s)
- ☐ Liquid soap
- ☐ Long-handled boot brush
- ☐ Paper towels
- ☐ Rain jacket, pants, and hat
- ☐ Sponges
- ☐ Spray bottle

*Note:* Clothing needs will vary according to weather and working conditions.